

Claims

What is claimed is:

- [c1] A method of making fused silica, comprising:
generating a plasma;
delivering a powder containing silicon dioxide into the plasma to produce silica particles; and
depositing the silica particles on a deposition surface to form glass.
- [c2] The method of claim 1, wherein a nominal grain size of the powder ranges from 0.1 to 300 μm .
- [c3] The method of claim 1, further comprising delivering a dopant material into the plasma to produce doped silica particles.
- [c4] The method of claim 3, wherein the dopant material comprises a compound capable of being converted to an oxide of at least one member of the group consisting of B, Al, Ge, Sn, Ti, P, Se, Er, Na, K, Ca and S.
- [c5] The method of claim 3, wherein the dopant material comprises a fluorine compound.
- [c6] The method of claim 5, wherein the fluorine compound is selected from the group consisting of CF_4 , $\text{CF}_x\text{Cl}_{4-x}$, where x ranges from 1 to 3, NF_3 , SF_6 , SiF_4 , C_2F_6 , and F_2 .
- [c7] The method of claim 1, wherein the plasma is generated by induction with a high frequency generator.
- [c8] The method of claim 1, wherein the powder further comprises a dopant material.
- [c9] The method of claim 8, wherein the dopant material comprises fluorine.
- [c10] The method of claim 1, wherein the silica is formed in an enclosure having a water vapor content less than 1 ppm by volume.

- [c11] The method of claim 1, wherein the powder is silica.
- [c12] The method of claim 1, wherein the powder is natural quartz.
- [c13] The method of claim 1, wherein the powder is synthetic quartz.
- [c14] A method for manufacturing a photomask material, comprising:
 - delivering a powder containing silicon dioxide into a plasma to produce silica particles; and
 - depositing the silica particles on a deposition surface to form glass.
- [c15] A feedstock for making fused silica by plasma induction comprising silica powder.
- [c16] The feedstock of claim 15, wherein a nominal grain size of the powder ranges from 0.1 to 300 μm .
- [c17] The feedstock of claim 15, wherein the silicon-dioxide powder is doped with fluorine.
- [c18] A feedstock for making fused silica by plasma induction comprising quartz.
- [c19] A photomask for use at 157-nm including a silica glass made by a method comprising:
 - generating a plasma;
 - delivering a powder containing silicon dioxide into the plasma to produce silica particles; and
 - depositing the silica particles on a deposition surface to form glass.